**TRIP REPORT (TR-05-37)**
**Ponderosa Pine Health**
**Trapper-Bunkhouse, Darby Ranger District, Bitterroot National Forest**
**October 19, 2005**

On October 19, 2005, I accompanied Ward McCaughey, Mick Harrington and Karen Estill from the Rocky Mountain Research Station (RMRS), and Dave Lockman, North Zone biologist, on a visit to the Trapper-Bunkhouse analysis area. This visit was at the request of Cheri Hartless, who was unable to accompany us to the field. Cheri was concerned about the overall health of the ponderosa pine in RMRS's proposed study area in Trapper-Bunkhouse and asked if I would evaluate the insects and diseases present in two proposed research sites.

**First Stop- Unit 5**

Unit 5 is adjacent to FS Road #13225, north of McCoy Creek. We climbed the slope up from the parking spot on FS Road #13225, and entered into an area south of unit 5, which is dominated by Douglas-fir (80%), with pockets of ponderosa pine (20%). Average dbh (diameter at breast height) is about 12", with many trees in the 6-10" dbh size class, and scattered larger trees. As we moved up the hill and toward the western portion of the unit, ponderosa pine became much more dominant. We began to see high amounts of mortality in the ponderosa pine near the ridge that runs northeast down the middle of unit 5. Most of the mortality is in the 6-12" ponderosa pine, but also is in an occasional 18+" dbh ponderosa pine. We found evidence of mountain pine beetle (*Dendroctonus ponderosae* Hopkins; MPB) in most of the mortality, including pitch tubes and gallery patterns typical of MPB. We also found evidence of more recent western pine beetle (*Dendroctonus brevicomis* LeConte; WPB) attacks in a few of the larger dead ponderosa pine, one which had been recently struck by lightning. The MPB-killed trees appeared to have been dead for at least 10 years and probably longer. Many trees had already broken off at ground level, creating openings with a considerable fuel load. We encountered areas where the live basal area had been reduced by 50% or more. The live component in these areas tend to be the larger trees, and average around 14-16" dbh. The crowns of the live trees show good growth and good needle retention, and show no signs of being infected with root disease. We found no current MPB attacks, but we did find a few current attacks by WPB and one green ponderosa pine of about 6" dbh was being currently attacked by a large *Ips* sp. beetle, which we collected for identification.

We kept moving uphill until we walked into a moist grand fir habitat type. This area is very densely stocked with Douglas-fir, ponderosa pine and a smattering of grand fir. Most of the Douglas-fir is of a large size (18-24" dbh) and most are heavily infested with Douglas-fir dwarf mistletoe (*Arceuthobium douglasii* Engelm.). The dwarf mistletoe ratings of these trees are 4 and 5. Many of these larger trees have been killed by Douglas-fir beetle (*Dendroctonus pseudotsugae* Hopkins; DFB) within the last 3 or 4 years. We found only two current-year attacks. There are also small pockets of smaller dead and suppressed Douglas-fir, in the 3-5" dbh size class. I found no evidence of root disease, but suspect these trees are infected with *Phaeolus schweinitzii* (Fr.) Pat., causal agent of schweinitzii root and butt rot. Evidence of this includes rounded tops and ragged crowns in the older Douglas-fir trees, and mortality in the smaller suppressed Douglas-fir. We observed only one live larger grand fir (18+" dbh). The few

other larger grand fir are dead and most are already down, and all have evidence of being heavily attacked by fir engravers (*Scolytus ventralis* LeConte). There are also a few scattered lodgepole pine in this area. Some have been killed by MPB, while others are heavily infected with cankers, most likely caused by *Cronartium comandrae* Pk., causal agent of comandra blister rust. These cankers might also be caused by *Atropellis piniphila* (Weir) Lohman & Cash. We also observed topkill in ponderosa pine, most likely caused by comandra blister rust, which leads me to believe the cankers in the lodgepole are also caused by *C. comandrae*.

We continued uphill on a well traveled trail on the ridge line, which is dominated by ponderosa pine. MPB-caused mortality continued to be a dominant feature. We then turned around and followed the ridge trail down through the unit. We walked through a flatter area that is still dominated by ponderosa pine, but is experiencing less mountain pine beetle-caused mortality. Trees in this area are lightly infected with *Elytroderma deformans* (Weir) Darker). Symptoms include trees with thin "lion tail" crowns, and other trees with small brooms in the lower portion of their crowns with shortened needle growth. Red needles had already been casted during the previous summer, so are no longer obvious.

Throughout the unit, we observed scattered large, older ponderosa pine stumps, which appear to be from harvesting done in the late 1800's or early 1900's. These stumps have hard internal "skeletons", but have no decay indicative of annosum root disease (*Heterobasidion annosum* (Fr.) Bref.). We dug at the decay in one stump and found numerous larger mushrooms fruiting throughout the decayed wood. We collected these mushrooms for further identification back at the lab.

**Second Stop- Unit 11**

In the afternoon, we drove to Unit 11, which is south of Unit 5 and just off the Hart Bench Road, #5711. Dave needed to return to the district, so was not able to join us in this second stop.

The portion of Unit 11 we visited is dominated by ponderosa pine, with a few scattered Douglas-fir in the over story, and pockets of Douglas-fir regeneration in the under story. When we first walked into the unit, we observed several Douglas-firs with low levels of Douglas-fir dwarf mistletoe near the road, but didn't observe much within the unit. Elytroderma needle disease is much more prevalent in this unit, but at low levels. Many trees have small, almost inconspicuous brooms in their lower crowns. We saw several trees with no systemic brooms, but with thin, lion tail crowns. Although this is also a symptom of annosum root disease, the absence of other symptoms, such as decreased terminal growth, led me to deduce these trees are being affected by Elytroderma needle disease, rather than annosum root disease.

The basal area in this unit appears to be lower than in unit 5, but is still a bit high relative to preventing attack by mountain pine beetles. Presently, mountain pine beetles are not a dominant agent in this unit.

**Discussion**

The dominant agents on these two sites are bark beetles, Douglas-fir dwarf mistletoe, and Elytroderma needle disease. The proposed research treatments include control with no treatment, understory removal, and thin from below with some commercial thinning to reduce the basal area to 40-60 square feet per acre. Ponderosa pine will be featured in all treatments. The vegetation treatments are further combined with several post-treatment burn options. All treatments will be replicated three times.

Bark beetles

When I returned to the Missoula lab, I reviewed past aerial detection surveys to try and determine the age of the MPB attacks in unit 5. MPB was very active in the area from the early 1980's to the late 1980's, indicating the mortality is approximately 20 years old. This corresponds to what we observed on the ground. Region One is currently experiencing an outbreak of MPB, but the populations do not appear to be high in the portion of the Trapper-Bunkhouse area we visited. The 2005 aerial detection survey maps show MPB on the Bitterroot NF, but very little in the immediate vicinity of Trapper-Bunkhouse.

Past MPB attacks reduced the square feet of basal area in pockets of unit 5, but the overall basal area is still high enough to be of concern for future attacks by MPB. Vegetation treatments that reduce and maintain the basal area at 80 square feet or less per acre should greatly decrease the probability of the stand incurring mortality from MPB attacks.

WPB responds to different cues than MPB, and is less dependent on basal area and more dependent on individual host vigor. Larger ponderosa pines experiencing droughty situations or have incurred an injury such as from lightning or fire, are quite susceptible to attack from WPB. WPB has been active in the Trapper-Bunkhouse area over the last few years, no doubt in response to the drought over the last 5+ years. Management that increases site resources to individual trees, such as basal area reduction, should decrease the probability of mortality from WPB. The present relief from the ongoing drought should also improve conditions for individual trees, and thus decrease the probability of attack from WPB.

DFB has been extremely active on the Bitterroot National Forest (NF) for the last 5 years, but in many areas appears to be returning to more endemic levels. We found only a few current year attacks in unit 5 in an area with heavy mortality from previous years' attacks. Although the populations of DFB are still quite high, they appear to be declining throughout the Bitterroot NF. DFB is one of the less-aggressive bark beetles, but does seem to occur more frequently in stands with a high basal area (>=120 square feet) and large (>14" dbh), old (>100 years) Douglas-fir trees. Although decreasing the basal area should decrease the potential for DFB, caution must be taken when trying to maintain Douglas-fir with intermediate harvesting. Intermediate harvesting can potentially illicit a response from root disease on site and cause a flush of mortality in susceptible species, such as Douglas-fir. Although we did not positively identify root disease in Douglas-fir in unit 5, it is quite commonly found in the foothills of the Bitterroot Mountains.

Douglas-fir Dwarf Mistletoe

Douglas-fir dwarf mistletoe is present at high levels in unit 5 and present at much lower levels in unit 11. Ratings of 4 and 5 in unit 5 indicate the disease has been present in the area for quite some time, and infected individuals are experiencing significant growth loss, as well as reduced regeneration potential. On the other end of the pendulum, these same infected individuals are also providing cover and habitat for certain wildlife. Removal of infected individuals will decrease the level of dwarf mistletoe in the stand, but apparent disease-free Douglas-fir trees near infected individuals probably have latent infections, which will respond to the stand being opened up. All infected overstory trees would have to be removed to eliminate dwarf mistletoe from the stand. Any infected residuals will continue to infect neighboring understory Douglas-fir trees. The vegetation treatments being recommended will feature ponderosa pine, but Douglas-fir overstory trees will also likely be left on site, so Douglas-fir dwarf mistletoe will likely continue to be a part of this stand. If this is the case, then it might be better to leave the lighter infected individuals over the heavier infected individuals in order to increase the longevity of the leave trees.

Elytroderma Needle Disease

We found Elytroderma needle disease in one pocket in unit 5 on the flatter part of the ridge running down the middle of the unit. It is more ubiquitous in unit 11. Elytroderma needle disease has been present at varying levels on the Bitterroot NF for years. In some areas, it has become a serious problem, causing a quick decline in larger individual trees, and outright mortality in others. Management recommendations are based on research done in California and have included treatments to increase individual host vigor, thus allowing trees to resist infection. This is apparently more effective in younger stands. We have worked with the Bitterroot NF North Zone to install plots in precommercial thinning stands of ponderosa pine with ubiquitous infections of Elytroderma. Two thinning regimes with and without pruning were completed in 2004 and will be monitored for 5 to 10 years. These plots are north of Lake Como, so are not too far from these sites.

The California research has indicated that older, infected trees appear to worsen if the stand is opened up, which leaves very few options when confronted with severe infections in older stands. We have wanted to install plots in various thinning regimes in older trees to monitor the effects of thinning on Elytroderma in older ponderosa pine. Ward and Mick have offered to collect pre- and post-treatment data on Elytroderma infections within the RMRS research project. This is a great opportunity to capture more data on treatment effects on Elytroderma needle disease. I agreed to assist in this data collection by training the crew on how to collect the appropriate data.

Miscellaneous

The Ips beetle was identified as *Ips emarginatus* (LeConte) by Ken Gibson, Entomologist in our Missoula office. This beetle is considered a secondary bark beetle and is often associated with MPB.

I identified the mushrooms collected from the ponderosa pine stump to the genus *Lactarius*. This genus of mushrooms is mycorhhizal with their host trees, and is not pathogenic.

In conclusion, I did not see any disease or insect that should hamper the use of these sites for RMRS's research. Although Elytroderma needle disease will likely increase in response to vegetation treatments (at least in unit 11), I don't think it warrants stopping planned vegetation treatments. Ward's offer to monitor the effects of various vegetation treatments on Elytroderma needle disease in older ponderosa pine is a great opportunity to increase our knowledge of this disease. Such data is lacking in western Montana and will help answer questions we have about managing Elytroderma in older stands.

I appreciated the opportunity to visit these sites with Ward, Mick, Karen and David, and I commend the Bitterroot NF and Rocky Mountain Research Station for their cooperative working relationship. I look forward to assisting in this study.

/S/ BLAKEY LOCKMAN

BLAKEY LOCKMAN
Plant Pathologist
Forest Health Protection,
State and Private Forestry

United States Department of Agriculture | Forest Service | Region One | 200 East Broadway, P.O. Box 7669, Missoula, MT 59807

File Code: 3420
Route To:

Date: December 2, 2005

Subject: Ponderosa Pine Health in Trapper-Bunkhouse TR-05-37

To: Forest Supervisor Bitterroot National Forest

On October 19, 2005, Blakey Lockman, plant pathologist, accompanied Ward McCaughey, Mick Harrington and Karen Estill from the Rocky Mountain Research Station (RMRS), and Dave Lockman, North Zone biologist, on a visit to the Trapper-Bunkhouse analysis area. Cheri Hartless had requested our assistance in assessing the overall health of the ponderosa pine in two units of Trapper Bunkhouse, units 5 and 11, being proposed as research sites for monitoring various vegetation treatments, coupled with several post-treatments burn options. Blakey found older mountain pine beetle mortality in the ponderosa pine, older and current Douglas-fir beetle attacks in the larger Douglas-fir, Douglas-fir dwarf mistletoe, and Elytroderma needle disease in ponderosa pine. None of these agents should prevent the use of these units as research sites for monitoring various vegetation treatments.

Enclosed is a trip report detailing their visit plus discussion about the insects and diseases existing in these units. Please don't hesitate to contact our office if we can be of further assistance.

/s/ Dorothy Sharp (for)
PAUL RIES
Region 1/Region 4 NFP Coordinator

Enclosure

cc: Ward McCaughey, Mick Harrington, Dave Lockman, Cheri Hartless, Karen E Estill, Gregg DeNitto